

## **Towards a Canonical Typology of Prosodic Systems<sup>1</sup>**

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### **1. Property-driven typology**

Some time ago, Lehiste (1970:1) wrote that “a certain degree of vagueness seems to characterize most discussions of prosodic features”. Unfortunately, such vagueness and confusion still reign in discussions of prosodic typology, e.g. concerning questions such as those in (1).

- (1) What’s a “tone language”?  
What’s a “stress language”?  
Is there a third distinct prosodic type called “pitch-accent language”?

Part of the problem may stem from a corresponding confusion about typology itself. Thus, there may be disagreement concerning the answers to questions such as those in (2).

- (2) a. what are the goals of typology or typological comparison?  
b. what are the objects of typological comparison? languages or properties?

With respect to (2b), does typology aim to provide “a principled way of classifying the languages of the world by the most significant properties which distinguish one from another” (Hagège 1992: 7) Or, is “typology... not so much about the classification of languages as about the distributions of individual traits—units, categories, constructions, rules of all kinds—across the linguistic universe; these distributions, not languages as such, are the primary objects of comparison” (Plank 2001: 1399). According to the first view, the goal of phonological typology would be “to classify languages according to the phonemes they contain... typology is the study of structural features across languages. Phonological typology involves comparing languages according to the number or type of sounds they contain” (Vajda 2001). Indeed, much work in this area has consisted of establishing inventories of contrasting surface segments, e.g. the UCLA Phonological Segment Inventory Database (UPSID) (Maddieson & Precoda 1990). Such emphasis on surface contrasts and sounds should not conflate a useful distinction between phonological vs. phonetic typology.

In Hyman (2009) I argued that goal of phonological typology is not to classify or taxonomize languages, but should instead be “property-driven”. Rather than comparing (surface) inventories, counting phonemes, etc., the goal is to characterize the same vs. different ways in

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which individual properties are exploited within phonological systems. For example the feature of nasality may be underlying contrastive in the five ways indicated in (3) (cf. Cohn 1993, Clements & Osu 2003):

- (3)
- |    |                          |   |                       |      |          |
|----|--------------------------|---|-----------------------|------|----------|
| a. | on consonants only       | : | /m, n, ŋ/             | e.g. | Iban     |
| b. | on vowels and consonants | : | /ĩ, ã, ã̃/, /m, n, ŋ/ | e.g. | Bambara  |
| c. | on vowels only           | : | /ĩ, ã, ã̃/            | e.g. | Klao     |
| d. | on whole morphemes       | : | /CVC/ <sup>N</sup>    | e.g. | Barasana |
| e. | absent entirely          | : | -----                 | e.g. | Doutai   |

As in phonology in general, the most significant typological distinctions involve input-output relations and especially differences in lexical representations. (3a-e) thus represent five different possibilities for contrasting nasality at the morphophonemic level of representation, including not at all (3e). Unless we are explicit about the level(s) of representation on which phonological typologies are based, we risk even greater confusion and disagreement, if not indeterminacy.

Consider for example the phonetic qualities of Kabarian vowels according to Lass (1984: 160), based on Kuipers (1960):

- (4)
- |    |    |   |    |   |    |           |   |                        |
|----|----|---|----|---|----|-----------|---|------------------------|
| a. | i  | ĩ | ü  | u | b. | /'Close'/ | → | [ĩ, ɪ, i̇, u, ü, u...] |
|    | e  | ɪ | ʊ  | o |    | /'Mid'/   | → | [e, ɛ̃, ʌ, ɔ̃...]      |
|    | ɛ̃ | ə | ɔ̃ | ʌ |    | /'Open'/  | → | [a, ɑ...]              |
|    | a  |   |    | ɑ |    |           |   |                        |

While Lass groups these by vowel height in (4b), quite a number of analyses of the Kabarian vowel system have appeared in the literature:

- (5)
- |    |                            |                                   |          |
|----|----------------------------|-----------------------------------|----------|
| a. | /ĩ, ə, a/                  | (Ladefoged and Maddieson 1996)    | (= Lass) |
| b. | /ə, a/                     | (Halle 1970)                      |          |
| c. | /a/                        | (Anderson 1978)                   |          |
| d. | No vowels                  | (Kuipers 1960)                    |          |
| e. | /ĩ, ɜ, i:, e:, u:, o:, ɛ:/ | (UPSID; Maddieson & Precoda 1990) |          |

As in the case of nasality, a property-driven typology focuses on the different ways that the color features Front and Round contrast in the underlying phonological system:

- (6)
- |    |                          |  |                                |
|----|--------------------------|--|--------------------------------|
| a. | on vowels and consonants | /i, e, u, o, a/, /k, k <sup>y</sup> , k <sup>w</sup> / |                                |
| b. | on vowels only           | /i, e, u, o, a/, /k/                                   |                                |
| c. | on consonants only       | /ĩ, ə, a/, /k, k <sup>y</sup> , k <sup>w</sup> /       | (vertical vowel system)        |
| d. | on some vowels only      | /i, e, u, o, ɪ, ʌ/                                     | (vowel harmony system)         |
| e. | on whole morphemes       | /CVC/, /CVC <sup>j</sup> /, /CVC <sup>w</sup> /        | (palatal and labial prosodies) |

The analyses in (5a-d) propose that the Kabardian system is as in (6b). Since the phonological analysis of UPSID is one of surface rather than underlying contrasts, (5e) treats Kabardian as in (6a) (cf. Hyman 2008 and Vaux 2009 for more discussion concerning the strengths vs. limitations of UPSID).

The above examples show that in doing any kind of typology we must address (and overcome) two kinds of differences: (i) differences between languages; (ii) differences between linguists. While the first has to do with problems encountered in describing and comparing different linguistic properties, the second concerns the fact that linguists will analyze the same linguistic properties in different ways, as was seen in (5). The same issues arise in prosodic typology, which has overly focused on taxonomizing languages into predetermined “types” (stress-accent, tone, pitch-accent) rather than being property-driven. For reasons to be examined in the following sections, this has led to the aforementioned confusion and disagreement. In order to consider the issues that are involved, it will first be necessary to establish explicit definitions in §2, then turn to the issue of canonical typology in §3.

## 2. Defining terms in prosodic typology

### 2.1. Intonation

In order to know what we are talking about in establishing prosodic “types” on the basis of properties, one must first establish explicit definitions, a minimal criterion or set of criteria that a system must exhibit in order to be “stress-accent”, “tone” etc. To illustrate the value of an explicit definition, consider the one Ladd (2008a: 4) offers for intonation:

- (7) Intonation, as I will use the term, refers to the use of *suprasegmental* phonetic features to convey “postlexical” or *sentence-level* pragmatic meanings in a *linguistically structured* way.” [his italics]

Ladd goes on in subsequent paragraphs to explain the terms he italicizes: He restricts intonation to *suprasegmental* features since he doesn’t want to talk about cases where yes-no questions are marked by segmental particles. By insisting on *sentence-level pragmatic meanings*, he wishes to exclude word-level functions of pitch and other suprasegmentals. While these terms seek to tell the reader what intonation is, the third exclusion, *linguistically structured*, is designed more to tell the reader what will vs. will not be covered in his book, e.g. variations in pitch or tempo which may correlate with a speaker’s state of mind and which Ladd identifies as “paralinguistic.”

From this example we observe that an explicit definition potentially serves two overlapping purposes. The first and major function is, of course, to designate what a term refers to, perhaps in contrast with something else (e.g. intonation vs. tone). The second purpose of a definition is to make explicit (and often limit) how a term will be used in a particular context. By adding the phrase “as I will use the term”, Ladd clarifies the view of intonation assumed for the purpose of his book. Without this phrase one could interpret (7) as a general, scientific claim that anything which does not meet the stated criteria is not intonation. This would, however, be wrong: (7) is not a claim that can be empirically falsified. In actual practice, the requirement of sentence-level pragmatic meanings is probably one that everyone would acknowledge. With respect to the other criteria, however, different researchers may wish to either narrow or broaden the definition for their own purposes. For example, while Ladd refers to “suprasegmental phonetic features” in general, for his purpose Gussenhoven (2007: 253) restricts intonation to pitch:

- (8) “Intonation refers to the structured variation in pitch which is not determined by lexical distinctions as in tone languages.”

Gussenhoven's definition would thus seem not to cover the following prepausal intonations in the Bantu language Shekgalagari (Hyman & Monaka 2011: 277):

- (9)
- |    |                         |   |  |
|----|-------------------------|---|--|
| a. | penultimate lengthening | : | declaratives, citation forms   |
| b. | final vowel devoicing   | : | ideophones   |
| c. | final vowel lengthening | : | paused lists   |
| d. | ∅ (no marking)          | : | yes-no questions, WH-questions, imperatives,<br>hortatives, vocatives, exclamatives, monosyllabic<br>prepausal words |

Examples are seen in (10), where (ˊ) indicates high tone, (↓) downstep, (ˋ) a low falling tone, and the absence of an accent indicates a level low tone:

- (10)
- |    |               |   |  |   |
|----|---------------|---|--|---|
| a. | declarative   | : | a-bón-á mu-lî:mi                             | ‘he sees the farmer’ (ˋ = low falling tone) |
| b. | ideophone     | : | a-rɪ bítsɪ                                   | ‘he left in a hurry’ (‘he went BITSɪ’)      |
| c. | paused list   | : | a-bón-á lu-ruli: ... malíli: ... lí mu-rî:ri | ‘he sees dust... rubbish... and hair’       |
| d. | interrogative | : | a-bón-á mu-limi                              | ‘does he see the farmer’                    |
|    | imperative    | : | bón-á mu-limi                                | ‘see the farmer!’                           |
|    | vocative      | : | ntó Gabaloxúŋ                                | ‘come here, Ghabalogong!’                   |
|    | exclamative   | : | á ↓ʃi-xúlu                                   | ‘what a situation!’                         |

It seems clear that intonation can be tonal or non-tonal. Thus, Hyman & Monaka (2011: 285-6) ask:

“What are the necessary definitional properties of intonation? It seems there are at least three possibilities in determining what should vs. should not be considered ‘intonation’. One might restrict intonation to certain specific realizations (pitch, duration etc.). Alternatively, one might delimit intonation on the basis of a restricted set of functions (declarative, interrogative etc.). A final possibility is that intonation might be identified in terms of its domain or place in a grammar. In this last case, we might say that anything that originates at the intonational phrase or utterance level, or within the ‘Phonetic Form’ module of government-binding theory, is by definition ‘intonation’. In this last approach it would not matter if the mark were a feature, a mora, a segment, or a fuller ‘particle’.”

While definitions of intonation vary, there is general recognition of the complications posed by the above considerations: One can approach intonation from a functional, grammatical or phonetic point of view, each of which has non-intonational analogues. This should not be a problem, provided that a definition is explicit and consistently applied. Only if this is followed will it be possible to test other phenomena against a definition, as I have done with Shekgalari. In the following subsection I will present comparable definitions of stress-accent and tone.

## 2.2. Stress-accent and tone



Although the prosodic systems of languages such as W. Basque, Tokyo Japanese, and Somali meet the definition for tone in (12), certain scholars insist that they should be taxonomized as a third type, termed “pitch-accent”. This is addressed in the next subsection.

### 2.3. Pitch-accent

The classic case of a third type of “pitch-accent” system is Tokyo Japanese (analyzed variously by McCawley 1968, 1978, Haraguchi 1979, Poser 1984, Pierrehumbert & Beckman 1988, among others). As indicated by the arrow in (16a), Tokyo Japanese words have at most one pitch drop from H to L, which has often been interpreted as an “accent”:

(16)		‘pillow’ + nom.	‘heart’ + nom.	‘head’ + nom.	‘fish’ + nom.
a.	accentual	ma <sup>↓</sup> kura ga	koko <sup>↓</sup> ro ga	atama <sup>↓</sup> ga	sakana ga
b.	tonal	makura ga H	kokoro ga H	atama ga H	sakana ga
c.	approx. phonetic	mákùrà gà	kòkòrò gà	àtāmá gà	sàkànā gā

As indicated in (16b), a strictly tonal analysis with a pre-linked H is also possible after which a predictable pitch drop occurs. (Some analysts prefer a HL representation.) The last example, *sakana* ‘fish’, shows that a word does not require a lexical accent/tone. In both analyses only one position is lexically marked on the basis of which the different tone-bearing units receive predictable output pitches. The question is whether such a “sparse” tone system requires the recognition of a third type of system termed “pitch-accent”.

Much of the motivation for an accentual interpretation is that Tokyo Japanese accent/tone is culminative, a property it shares with stress-accent systems. It is important to note, however, that the obligatory and culminative stress properties presented in (11) define four situations when applied to the distribution of an “accent-like” /H/ tone in different languages:

(17)	<i>Oblig(H)</i>	<i>Culm(H)</i>	<i>Description</i>	<i>Example</i>
	+	+	: a word must have one and only one /H/	Kinga Schadeberg (1973)
	+	-	: a word must have at least one /H/, but may have more	Iquito Michael (2010)
	-	+	: a word can have at most one /H/ or no /H/	Somali Hyman (1981)
	-	-	: a word can have any number of /H/ or no /H/	Seneca Chafe (1977)

The first situation is exemplified from the Bantu language Kinga in (18), where an obligatory and culminative /H/ can be on either the first or second mora of a long-vowel syllable. In the following infinitive forms, the /H/ is assigned to the antepenultimate mora of an infinitive verb:



- (21) a. mark the first syllable extrametrical  
 b. build bisyllabic trochees left-to-right  
 c. assign a H tone to the first syllable of a trochee iff either syllable is closed

This yields representations such as in (22).

- (22) a. < $\sigma$ > (CáC.Ca) (CaCa) ...      c. < $\sigma$ > (CáC.Ca) (Cá.CaC) ...      (\*CULM(H))  
 b. < $\sigma$ > (Cá.CaC) (CaCa) ...      d. < $\sigma$ > (Ca.Ca) (Ca.Ca) ...      (\*OBLIG(H))

(22a) has a H tone assigned to the first syllable of the first trochee, since it is closed. The same initial H is observed in (22b), this time because the second syllable of the first trochee is closed. Both feet in (22c) receive a H, showing that the H is not culminative. Finally, in (22d), where all of the syllables are open, no H is assigned. H is thus neither obligatory nor culminative in Seneca.

The question for anyone feeling that there is a third prosodic type must thus ask him- or herself: Which of the above situations is “pitch-accent”? This question will be further addressed in §4.3 below. For now I will simply present the following, I hope obvious observation: While some languages must be analyzed with stress-accent (e.g. English), some with tone (e.g. Kam (Shidong) in (13)), and some with both (e.g. Iquito in (19)), no language *MUST* be analyzed with a third property called “pitch-accent”. An analysis in terms of tone—and perhaps also stress-accent is always possible.

### 3. Against taxonomizing by language type

In §1 I argued for a property-driven approach to typology. In this section I want to further comment on the temptation to taxonomize languages into “types”. Although the goal of typology is to study linguistic properties, not to classify languages, we do sometimes use phrases like “stress language” and “tone language” as a convenience. There are at least three reasons, however, why we should resist assigning labels to languages. The first is that this gives the impression that the labels are mutually exclusive. Prior to our current understanding, it was long believed that languages fell into two non-intersecting types: “stress languages” and “tone languages”. Even though we now know that this is wrong, by using these terms there is always the possibility of confusion. Thus consider the following recent statement:

“Hyman (2007)... reduc[es] the typology of word prosodic systems to tone languages and stress languages.” (van der Hulst 2011:12)

Van der Hulst is referring to work of mine that clearly makes the four property-driven distinctions in (14), among others, but it is possible to conclude from the above characterization that I reduce individual languages to either one or the other category. Since I recognize that languages can have word stress, word tone, both, or neither, this would be not only an inaccurate inference, but also a claim about prosodic systems that is factually wrong. Of course what van der Hulst is referring to is that I do not recognize a coherent set of PROPERTIES which establish “pitch-accent” as distinct from stress-accent and tone (cf. §4.3 below). A similar misleading statement would be to propose that alignment systems define two types: “ergative/absolute

language” vs. “nominative/accusative language”. As researchers in this area all recognize, the two are not mutually exclusive—in fact, it hard to find a language which is exclusively “ergative/absolutive” in its morphology and syntax.

A second, related reason not to think of typology as taxonomizing languages is that the resulting labels give the impression that whole systems (if not whole languages) can be assigned to a type. This in turn invites often unproductive controversy over whether Language X should be classified the same as Language Y or as Language Z. Consider for example the following hypothetical exchange between two typologists who disagree on whether German should be classified with English or with French on the basis of its vowel system:

Typologist #1: German should be classified with English as a “tense-lax vowel language”, since both contrast /i, u/ vs. /ɪ, ʊ/ (etc.), as opposed to French.

Typologist #2: No! German should be classified with French as a “front-rounded vowel language”, since both have /ü, ö/, as opposed to English.

Typologist #3 (e.g. me): No! You’re both wrong. A property-driven typology would look like the table in (23), where I have also added Spanish:

(23)

	<i>lax high vowels</i>	<i>no lax high vowels</i>
	<i>front-rounded vowels</i>	German
	<i>no front-rounded vowels</i>	English
		French
		Spanish

A misguided example of this sort asks whether the Mandarin tone+stress system places it closer to English or to Tokyo Japanese. In the following passage Beckman & Venditti (2011:531) promote a similarity between Standard Mandarin (Putonghua) third tone L+H and English intonational L+H\*:

“We cited Hyman (2006) here because this chapter is very representative of a widely-held assumption: that there are fundamental prosodic differences among spoken languages which naturally fall out from the difference between using tone [read: pitch] “to make semantic distinctions” [= tone] and using it “to add functional meaning” [= intonation] ... This is a useful distinction.... However, contra Hyman (2006) we do not see that it correlates neatly with all of the other distinctions that could be made on the basis of the functions outlined in Sections 5.2 [Prosodic Grouping] and 5.3 [Metrical Prominence]. That is we can appreciate the difference in ease of counting tones in Putonghua versus English that falls out from the fact that a L+H that is anchored to a stressed syllable in Putonghua is a toneme whereas a L+H\* that is anchored to a stressed syllable in English is a pragmatic morpheme. But this difference does not change *the fact that these two languages are far more like each other in many other respects than either is to a language such as Japanese*. There is no useful classification of prosodic types that falls out from the classification of languages in terms of the tonemic function alone.” [my italics—LMH]

The misguided question is whether Putonghua is more like English or more like Tokyo Japanese, which has a HL pitch drop rather than L+H (cf. Hyman 2011b). Their last sentence appears to dismiss the fact that the L+H analysis concerns lexical tone in Standard Mandarin vs. intonation in English. Ignoring, or at least downplaying the different status of L+H in the two languages, is comparable to saying that English and French are similar because they both have [æ̃] (cf. *cinq*

and *sank*). Compare, however, Gussenhoven's (2007: 256) more appropriate conclusion regarding the similar H+L analysis of Tokyo Japanese and English:

“While phonologically comparable, the pitch accents of Japanese and English have very different morphological statuses. In Japanese, they form part of the underlying phonological specification of morphemes, along with the vowels and consonants. Intonational pitch accents are morphemically independent of the words they come with, and are chiefly used to express the information status of the expression. The fact that the English example in [his] (4) seems to have an accentuation similar to the Japanese example in [his Japanese example] (3) is *entirely accidental*.” [my italics—LMH].

The final reason to avoid labeling is that the labels are often unclear; the phrase “X language” can mean:

- (i) a language that has X, e.g. a “tone language” has tone, a “click language” has clicks
- (ii) a language that lacks X, e.g. an “open syllable language” lacks closed syllables
- (iii) a language that marks X more than Y, e.g. a “word language” vs. “syllable language”.

In this context, what would “pitch-accent language” mean? Some possibilities are:

- (24) a. a language which has an obligatory (but not necessarily culminative) tone?
- b. a language which has a culminative (but not necessarily obligatory) tone? (Hualde, in press)
- c. a language which has either a culminative OR an obligatory tone? (van der Hulst 2011)
- d. a language which has a privative tone (e.g. /H/ vs. Ø)? (Clark 1988)
- e. a language which limits tonal contrasts to the stressed syllable?
- f. a language which restricts its tones in whatever way?

“A pitch-accent system is one in which pitch is the primary correlate of prominence and there are significant constraints on the pitch patterns for words....” (Bybee et al 1998:277)

- g. a language which has only two tone heights (H, L)?

“... if we push the use of accents to its limits (at the expense of using tones), this implies allowing unaccented words (violating obligatoriness) and multiple accents (violating culminativity). In this liberal view on accent, only languages that have more than a binary pitch contrast are *necessarily* tonal....” (van der Hulst 2011: 13)

A point which I have repeated made is that there is no coherent definition of “pitch-accent system” which covers all and only all of the prosodic systems that have been so labeled. Nor is it clear what an appropriate prototype might be. In the following section I will further demonstrate this by contextualizing the discussion in terms of Corbett's (2007) “canonical approach” to typology.

#### **4. A canonical approach to word-prosodic typology**

Recall from §2 that definitions can serve two different functions. The first is scientific: the definition tells us what is vs. is not a case of X in some objective sense. The second is practical:

the definition tells us what a given researcher or community of researchers consider to be an instance of X. In the case of pitch-accent there is lack of clarity and lack of agreement. As I have indicated above, I think the enterprise of establishing a third type is misguided. While it would be possible to establish a definition of a third type in the “practical” sense, it would not meaningfully begin to treat the wide range of phenomena which have been identified as “pitch-accent” (see §4.3 below). The difficulties become even clearer if we enhance the definition-as-minimal-criterion strategy with a “canonical approach” to prosodic typology, which Corbett (2007: 9) describes as follows:

“The canonical approach means that I take definitions to their logical end point, enabling me to build theoretical spaces of possibilities. Unlike classical typology, only then does one ask how this space is populated with real instances. The canonical instances, that is, *the best, clearest, indisputable* (the ones closely matching the canon) are unlikely to be frequent.... Nevertheless, the convergence of criteria fixes a canonical point from which the phenomena actually found can be calibrated, following which there can be illuminating investigation of frequency distributions.” [my italics—LMH]

As an an example of what is meant by “canonical”, let us consider how a paradigm should ideally be marked. Below are three examples of subject person/number marking on verbs:

(25)	Italian	Mee (Ekagi)	Hakha Lai
	<i>sg. pl.</i>	<i>sg. pl.</i>	<i>sg. pl.</i>
1 <sup>st</sup> pers.	-o -iamo	-a -e	ka- ka-n-
2 <sup>nd</sup> pers.	-i -ate	-e -aa	na- na-n-
3 <sup>rd</sup> pers.	-a -ano	-i (m.) -ai -a (f.)	a- a-n-
	(-are verbs)	(Doble 1987:94)	

As seen, Italian has distinct suffixes for each combination of person+number, while Mee, a Trans-New Guinea language of Indonesia (Papua) shows two cases of syncretism: *-a* marks both first person singular and third person feminine singular, while *-e* marks second person singular and first person plural. If we assume that a paradigm canonically marks each combination of morphosyntactic features distinctly, Italian is both better and clearer than Mee. On the other hand, the Tibeto-Burman language Hakha Lai outdoes Italian: in this language there are three distinct markers for person (*ka-*, *na-*, *a-*) and an independently segmentable form (*-n-*) for plural. Hakha Lai better meets what Vennemann (1972) identifies as Humboldt’s Universal: “one meaning, one form”. The canonical paradigm thus will have one distinct marker for each morphosyntactic feature. Of course no language will be perfect in this sense. As Corbett points out, canonicity is not necessarily frequent, or even attested: It is logically arrived at by considering the function of the property under examination. In the following three subsections I will address in turn the canonical function of stress-accent, tone, and finally pitch-accent.

#### 4.1. Canonical stress-accent

In Prague School terms, the canonical function of stress-accent is *syntagmatic*: It should unambiguously identify and mark off major category words within utterances. To best do this, stress therefore should be:

- (26) a. obligatory : all words have a primary stress  
 b. culminative : no word should have more than one primary stress } definitional  
 c. predictable : stress should be predictable by rule  
 d. autonomous : stress should be predictable without grammatical information  
 e. demarcative : stress should be calculated from the word edge  
 f. edge-adjacent : stress should be edge-adjacent (initial, final)  
 g. non-moraic : stress should be weight-insensitive  
 h. privative : there should be no secondary stresses  
 i. audible : there should be phonetic cues of the primary stress

In other words, stress should be “biunique”: One should be able to predict the stress from the word boundaries and the word boundaries from the stress. Of course, many stress systems diverge quite dramatically from the above canonical properties, e.g. English, where:

- (27) a. primary stress is often not predictable: *Cánada* vs. *banána*  
 b. secondary stress is often not predictable: *súbject* vs. *ínsèct*  
 c. primary and secondary stress can be morphological: *cónvert* vs. *convért*; *séparàte* vs. *séparate*  
 d. stress shows various word-level alternations and cyclic effects: *ícon* vs. *icónic*  
 e. stress shows post-lexical rhythmic effects: *thirtéen* vs. *thirteen linguists*  
 f. stress is sensitive to syllable weight

With respect to (27e), Martinet (1961: 87) pointed out some time ago that stress-to-weight phenomena detract from the perfect demarcativity of stress. Thus, the two stresses of the Latin string *bónacalígula* allow for two possible parsings: *bóna Calígula* (= correct) or *bónaca ligula*.

In support of this Praguian position, Hyman (1977, 1978) and Bybee, Chakraborti, Jung, & Scheibman (1998) argue that languages first develop demarcative stress, historically, which then can be subjected to further restructuring. Bybee et al also point out that multiple phonetic marking of stress tends to occur in languages where stress is not fully predictable. If stress is demarcative and edge-adjacent, packaging and recognition will be more transparent. If stress is unpredictable, the function shifts to identifying individual morphemes and words, resulting in greater effects on segmental distributions and realization. However, the canonical, i.e. “best, clearest, indisputable” function of stress is blind demarcation of word edges.

#### 4.2. Canonical tone

Differing from stress-accent, the canonical function of tone is to distinguish morphemes, hence optimally *paradigmatic*. While this might suggest five tone heights, as in Kam (Shidong), let us restrict the present discussion to H and L. The canonical two-height tone system should have the following properties, which guarantee that both tones will be maximally utilized:

- (28) a. binarity : both H and L are phonologically activated

- b. omniprosodicity : every tone-bearing unit (TBU) has a H or L
- c. unrestrictedness : all combinations of H and L occur
- d. faithfulness : every /H/ or /L/ is realized on its underlying morpheme and TBU
- e. lexical : /H/ and /L/ should contrast on lexical morphemes (since there are more lexical than grammatical morphemes)
- f. contours? :  $\widehat{HL}$  and  $\widehat{LH}$  contours should be possible on a single TBU
- g. floating tones? : H and L tonal morphemes and lexical floating tones should be possible

By the above criteria, Fasu, a language of Papua New Guinea, is non-canonical since only one (stressed) syllable per word can be marked H or L (May & Loeweke 1964). This produces the following relatively sparse tonal distributions:

(29)		<i>H tone</i>		<i>L tone</i>
a.	$\sigma$	mé ‘language’	mè	‘taro’
b.	$\sigma\text{--}\sigma$	támo ‘down below’	tàmo	‘matches’
		kíkí ‘bone’	kikì	‘tree type’
c.	$\sigma\text{--}\sigma\text{--}\sigma$	férepe ‘bushknife’	èresa	‘dark’
		sakáre ‘arrow’	hiwàti	‘eyelash’
		kenarí ‘tree type’	kenari	‘bamboo type’

The Bantu language Giriyama is also quite non-canonical since the underlying rightmost /H/ of a word shifts to the penultimate mora (Volk 2011: 1)

(30)	‘I want ...’ (all L tone)	‘he/she wants ...’ (penult H tone)
	ni-na-maal-a	a-na-maál-a
	ni-na-mal-a ku-guul-a	a-na-mal-a ku-guúl-a ‘... to buy’
	ni-na-mal-a ku-gul-a nguuwo	a-na-mal-a ku-gul-a nguúwo ‘... to buy clothes’
		‡ H

In Chimwiini, another Bantu language, privative /H/ is limited to the last two syllables and is strictly grammatical (there are no underlying tonal contrasts on lexical morphemes, e.g. noun stems, verb roots) (Kisseberth 2009). As seen in (31), a H is assigned to the final syllable if the subject is first or second person, to the penultimate syllable if the syllable is third person:

(31)	<i>singular</i>		<i>plural</i>	
	n-ji:lé ‘I ate’		chi-ji:lé ‘we ate’	} = grammatical final H
	ji:lé ‘you sg. ate’		ni-ji:lé ‘you pl. ate’	
≠	{	ji:le ‘s/he ate’	wa-jí:le ‘they ate’	= default penultimate H

The reader can quickly confirm that there are many other ways for tone systems to be non-canonical, i.e. to not conform with the canonical properties in (28).

#### 4.3. Canonical pitch-accent?

In contrast to stress-accent and tone, there is no canonical pitch-accent system. To observe this, let us ask for each of the following references: “Why is this prosodic system included in van der Hulst & Smith (1988), a collection on pitch accent?”:

- (32) a. Tokyo Japanese: only one indication of one specific tonal representation is needed per lexical word, and ultimately accentual phrase (Haraguchi 1988: 127)  
 b. Copala Trique: the five tone heights and contour tones contrast only on the final (stressed) syllable of the word (Hollenbach 1988: 170)  
 c. Zulu: “The contrast is between privative /H/ vs. Ø, hence pitch-accent.” (Clark 1988: 56)  
 d. Ijo: The tonal identity of the first word determines the tones of a whole tone phrase (Williamson 1988:254)

Illustrating (32d), Eferè (2001:158-9) sets up four tone classes A-D in Izon (Bumo), where (L) indicates that a vowel-initial word may begin L:

(32)	<i>class</i>	<i>schema</i>	<i>tone pattern determined by the A-D class of the phrase-initial word</i>
	A	(L) H + H	all TBUs in the phrase = H
	D	(L) H + HL	first word = all H, H spreads one TBU to the right; other TBUs = L
	B	(L) H + L	first word = all H; subsequent TBUs = L
	C	(L) HL + L	first word keeps its HL drop, remaining TBUs = L

The following are illustrations of A-D in the frame ... /náná kímí/ ‘man who owns/has...’ (whose tones are deleted):

(33)	A	(L) H + H	bélé	‘pot(s)’	→	bélé náná kímí	(H spreading to end)
	D	(L) H + HL	ikíé	‘friend’	→	ikíé nánà kìmì	(H spreading one TBU)
	B	(L) H + L	wárí	‘house’	→	wárí nánà kìmì	(no H spreading)
	C	(L) HL + L	sérì	‘scarf’	→	sérì nánà kìmì	(no H spreading)

Give the range of systems in (32) (and there are more!), it is really difficult to establish a hard-and-fast rule for when a “tone” is an “accent”. Hualde (in press: 4) makes the following attempt:

“I would like to propose that a lexical indication of pitch on a given syllable should be considered an accent to the extent that (a) it follows the criterion of culminativity (only one per word domain), (b) it is involved in the expression of pragmatic prominence, so that the syllable bearing it receives special enhancement when the word is pragmatically highly in discourse, and (c) its location is determined by metrical rules.”

As discussed in §2, it is always possible to provide a personal definition, either Hualde’s or another, but then one has to ask how systems will be classified which have non-culminative Hs (or Ls in some cases). For example, are the metrically assigned Hs of Seneca tones or accents? Is the default H of Iquito an accent, but the other Hs are tones? What about the Giryama form in (34)?

- (34) a-ná-gumbuhiziika ‘s/he is wiped out by utter destruction’ (Volk 2007: 17)
- 

Is the H which is attracted to the metrically strong penult an “accent” but the other H is a tone? Finally, what about Kyoto and related Japanese dialects which not only mark a single H to L pitch drop, but also require an indication of which words begin L and which do not (Haraguchi 1979). What about stress-dependent tone, as in Trique or Fasu? It makes little sense to propose a third type that covers only a subset rather than a full blown typology in which all systems can be placed. The definitions I proposed in (11) and (12) allow us to ask whether any individual prosodic system meets the definition for stress-accent? tone? both? or neither?

As we have seen prosodic systems can vary in numerous ways from the canonical expectations of stress-accent and tone enumerated in (26) and (28), respectively. What makes these canons attractive is that they follow from basic functions, just as Humboldt’s “one meaning, one form” provides “a canonical point” by which morphological paradigms can be calibrated. The challenge is to find an analogous motivating function for “pitch-accent” which would be distinct from both demarcative stress-accent and distinctive tone. Part of the complexity, of course, is that Hs and Ls can have at least the following four functions:

- (35) a. distinctive : distinguish morphemes (lexical, grammatical) at the word level  
 b. accentual : realize metrical prominence (word, phrase, utterance)  
 c. demarcative : mark prosodic domain boundaries (word, phrase, utterance)  
 d. pragmatic : distinguish utterance types (declarative, interrogative etc.)

We thus have seen a number complexities and mixes. However, although systems such as Seneca, Iquito and Giryama are remarkable, we do not need to give them a new name such as “pitch-accent languages”. Even if approached from a relative surface point of view, a third type cannot be identified. As Gussenhoven (2004: 42) has so aptly put it:

“‘Accent’ ... is an analytical notion and cannot be measured. [It is] thus different from stress, which is typically an observable phenomenon, and different also from tone, whose existence is equally measurable.” (Gussenhoven 2004: 42)

Why then do certain scholars continue to find the concept of “pitch-accent language” intuitive? Many of these so-called systems have a relatively low “tonal density”, diverging significantly from omniprosodic canonical tone in (28) (recall also Fasu from (29))

“A phonological typology of tone might be based on tonal density: how many locations are specified for tone, that is, have tonal associations? ... in the ‘densest’ case they specify every mora for tone, and in the sparsest case they just mark the phrasing.” (Gussenhoven 2001: 15296; cf. Gussenhoven 2004: 35).

“We may obtain a more informative typology if we modify the binary [ $\pm$ tone] parameter to encode relative tonal density. Lexical tonal density can be seen as a function of both the maximum number of tonal contrasts that are possible per syllable and the maximum

number of syllables per word that can bear lexically contrastive tone.” (Hualde, in press: 12)

However, to date, no one has translated the notion of tonal density into a revealing typological tool.

## 5. Summary

To summarize, we arrive at the following conclusions:

- (i) It is possible to provide a definition (requirements) for both stress-accent and tone.
- (ii) It is possible to provide a set of canonical properties of stress-accent and tone, drawing on how each can best realize its basic function (demarcative/syntagmatic vs. distinctive/paradigmatic)
- (iii) It is not possible to provide a definition or canons for a third “pitch-accent” system which would cover all and only all of the systems that have been labeled as such in the literature

In conducting this study there has been a more general question lurking in the background, which will necessarily require more attention in the future: What is the goal of prosodic typology? That is, why do we typologize? Let me conclude here by making two points. The first is that typology = traditional linguistics:

“... the goal of linguistics is... to explain why languages have the properties they do.”  
(Evans & Levinson 2010:2740)

The second is that phonology has always been typological. As Sapir (1925: 43) effectively put it many decades ago:

“... it almost goes without saying that two languages, A and B, may have identical sounds but utterly distinct phonetic [=phonemic] patterns; or they may have mutually incompatible phonetic systems, from the articulatory and acoustic standpoint, but identical or similar patterns.”

We would do well to assure that we typologize by properties and not by languages, and that the criteria be explicit and functionally motivated, as I have argued in the above paragraphs.

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